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PRIMARY CARE APPOINTMENT SYSTEMS: CAUSES AND IMPLICATIONS OF TIMELY ARRIVALS

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ABSTRACT

The primary goal of this study was to identify potential factors that might contribute to patient punctuality issues, while also assessing the satisfaction of a proposed intervention. In addition, we aimed to learn more about the psychosocial and behavioral implications that patients face with regards to arriving on time for their primary care visits. A mixed-method research study was used to identify and quantify potential factors that might contribute to patient punctuality issues, while also assessing the satisfaction of a proposed intervention. In addition to possible factors that contribute to punctuality, we aimed to learn more about how patients are affected when they arrive late for appointments. Through qualitative assessment, we explored the psychosocial and behavioral implications that patients face with regards to arriving on time for their primary care appointments. A total of 524 individuals out of 1050 patients (50%) responded to the paper-based survey. Of the 524 adult respondents, we excluded 103 (19.7%) participants due to the missing data on either of their historical behavior patterns, future intentions for arrival, or their definition of appointment time. We analyzed the data for the remaining 421 eligible survey participants. In addition, seven of the eight patient interviews were transcribed and analyzed in order to identify themes using the patient's own words to better understand the psychosocial and behavioral implications patients face on arriving to their appointment on time. Three primary themes emerge in the interviews related to the perception of arriving late to appointments at the FMC. The findings of this study indicate that regardless of patients' interpretation of appointment time, they typically arrive 10-15 minutes before the appointment time. In addition, there is a significant connection

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between patients' perceptions of historically arriving late to appointments and the intent to arrive very early to their future appointments. Combined with the qualitative results, this study suggests that most patients are motivated to be on time, in some cases seeing the idea of lateness as a contradiction of their own self-identity. The behavioral causes and implications of the findings are explained using the concept of Fear Appeals and the Protection Motivation Theory (PMT).

Keywords: Healthcare Analytics; Primary Care; Clinical Appointment Systems; Patient Attendance.

INTRODUCTION

Many physicians often voice a concern for not having enough time with their patients to address their complex health needs. Research using the National Ambulatory Medical Care Survey has shown that despite controlling for factors such as increasing patient age or complexity, an increased number of procedures, or adoption of electronic medical records, the perceived and real duration of primary care outpatient visits continue to increase (Shaw et al., 2014). In addition to increased duration of appointment times, primary care providers are faced with substantial work outside of the patient visit. Farber found that for every 30 minutes of scheduled patient visits, an additional 6.7 minutes of care is required outside of clinic time, amounting to an estimated 7.8 additional hours of clinical work per week for a full-time provider (Farber et al., 2007). Other studies have confirmed that primary care physicians spend an estimated 7-10 hours of work per week outside of scheduled office visits (Doerr, 2010). These trends can create dysfunctional clinic flow and tremendous competing demands for providers.

Residency clinics may be at even greater risk for dysfunctional clinic flow. Many residency clinics serve patients with lower socioeconomic status and more barriers to care, yet residents are in clinic less often than a full time practicing clinician. According to Accreditation Council for Graduate Medical Education for Family Medicine, Direct Supervision (supervising physician is physically present with the resident and patient) of patient care may be required based on the resident's level of training and ability, as well as patient complexity and acuity (Keirns & Bosk, 2008). Interaction between the resident and the supervising physician, and/or the supervising physician and the patient, takes time and may also impact clinic flow. Residency clinic flow challenges are thought to contribute to low numbers of primary care residents entering outpatient primary care settings upon graduation (Keirns & Bosk, 2008). As clinic flow deteriorates, providers face increased pressure to manage competing expectations. A study found that over 54% of physicians experience at least one symptom of burnout (Shanafelt et al., 2015). Additionally, satisfaction with work-life balance declined significantly between 2011 and 2014 (Shanafelt et al., 2015). Daily workload has been identified as an important reason for the high level of burnout among primary care physicians (Dyrbye et al., 2012). A recent study found that there is a significant connection between physician burnouts and the Electronic Health Record use during in-clinic sessions (Micek et al., 2020). During pandemics these factors are added to the fatigue, stress, and fear of getting exposed to the patients infected with the new virus. Multiple studies showed how COVID-19 outbreak led to a surge in physicians' stress and burnouts (Bradley& Chahar, 2020; Dinibutun,2020; Kannampallil et al., 2020). Very little work, however, has been done to identify the theoretical underpinnings of patient late arrivals and the perceptions of providers.

Improvements in clinic flow have been linked to improved cost savings, higher patient satisfaction, and less burnout for providers (Reid et al., 2010) Many factors have been shown to contribute to these inefficiencies over the years (Fetter & Thompson, 1966; Chambers et al., 2016), but excessive patient wait times due to unpredictable patient arrivals (both earlier and later than scheduled) have consistently shown to be related (Christl, 1973; Fontanesi et al., 2002; Gorodeski et al. 2017; Perros & Frier, 1996). In residency clinics, patients who arrive late are common, and appear to contribute to high variability in clinic flow (Perros & Frier, 1996; Xakellis & Bennett, 2001). Some studies have hypothesized that early arrivals contribute to longer clinic wait times and that clinic flow could be improved if patients were discouraged from arriving early (Antle & Reid, 1988). Recent data also suggests that later-arriving patients have shorter waiting times and improved patient satisfaction when compared to those who arrive early (Medway et al., 2016). Numerous interventions have been proposed to combat clinic flow shortcomings, as institutional policies are widely thought to have a significant impact on efficiency of office-based primary care (Shipman & Sinsky, 2013). The procedure on what to do when a patient arrives late for an appointment is one example of such policies.

While data pertaining to the effects of interventions upon non-attendance rates is plentiful, there is very little research on the relationship between interventions and patient punctuality. To our knowledge, only one study has examined the role of intervention in reducing patient unpunctuality. Research by Williams et al. explored a 12-month intervention where patients were informed of a tardy policy that stated that tardy patients would not be seen and instead rescheduled (Williams, 2014). The tardy policy intervention demonstrated that while the policy could improve patient punctuality, it could not alter improve patient wait times (Williams, 2014). Nonetheless, many clinics continue to implement change with the goal of having patients arrive even earlier. A recently common intervention involves alteration of appointment reminder system practices – in which patients are instructed to arrive at a given clinic 10-15 minutes prior to their scheduled appointment (Medway et al., 2016). Changes to rescheduling policies have also become quite common (Williams, 2014).

The primary goal of this study was to identify and quantify potential factors that might contribute to patient punctuality issues, while also assessing the satisfaction of a proposed intervention. In addition to possible factors that contribute to punctuality, we aimed to learn more about how patients are affected when they arrive late for appointments. Through qualitative assessment, we explored the psychosocial and behavioral implications that patients face with regards to arriving on time for their primary care visits.

The concept of Fear Appeals and the Protection Motivation Theory (PMT) were further explored during this analysis of common behavioral trends among certain groups of patients. The PMT was originally developed by Rogers in 1975 and is widely accepted as a framework for prediction of health behaviors (Milne et al., 2000). PMT proposes that people make decisions in times of stressful life events as a way to protect themselves from perceived threats. The theory posits that six elements (severity of the perceived threat, perceived vulnerability, expected efficacy of a response, response cost, perceived reward and perceived self-efficacy) interact together to form behavioral intentions that lead to the behavior (Milne et al., 2000). A meta-analysis of studies looking at the relationship between the PMT and twenty different health behaviors found the PMT elements have substantial impact on behavior prediction (Milne et al., 2000). Additionally, the body of work demonstrating the power and applicability of fear appeals models as a whole is quite extensive (Tannenbaum et al., 2015).

METHODS

Design, Setting, and Participants

A mixed-method research study was used to identify and quantify potential factors that might contribute to patient punctuality issues, while also assessing the satisfaction of a proposed intervention. In addition to possible factors that contribute to punctuality, we aimed to learn more about how patients are affected when they arrive late for appointments. Through qualitative assessment, we explored the psychosocial and behavioral implications that patients face with regards to arriving on time for their primary care appointments. The residency clinic is clinical practice of a family medicine residency program with 13 residents per year and the faculty clinical practice of the residency program faculty. The clinic cares for a panel of approximately 12,000 patients, about 40% of whom are covered by state Medicaid.

Our design involved the use of a quantitative patient survey to gain a better understanding of these relationships between perceptions, intended behavior, and actual behavior in conjunction with satisfaction of a proposed intervention: Implementation of an "arrival time" in which patients are instructed to arrive 15 minutes prior to their "appointment time."

Quantitative methodology

To better understand patients' beliefs and understanding of appointment time and their arrival to the clinic, a 5 item survey was developed and distributed to patients between July 23, and August 3, 2018 when they completed the front desk check in and registration process. The front office staff member noted the patient's time-stamped arrival time and their appointment time on the survey form before handing the form to the patient for completion. Upon completion of the survey, patients returned the survey to the front desk staff member, a medical assistant, or a check out desk staff member.

The survey included questions to identify patients' 1) understanding of "appointment time" concept, 2) perceived historical arrival pattern, and 3) intention for arrival in future. In addition, to detect their "actual delay or earliness," the arrival time of each individual into the clinic were recorded by an analyst and compared against their appointment time. As part of the validity and refinement process of developing the survey, clinic patients were invited to provide input on the wording and understandability of the survey questions. A copy of the survey is available upon request.

The question about patients' understanding of "appointment time" provided survey participants with four options in how they define "appointment time". Survey options included: 1) the moment they arrive at the center, 2) the moment when they check in, 3) the time when they are called to the providers' room, and 4) the time when they meet with the primary care doctor.

To better understand perceived historical arrival pattern**,** patients were asked to remember their past visits to the clinic and classify themselves based on how they perceived their historical arrival pattern in the following four groups: 1) whether they usually arrive *early* by *more* than 10 minutes [labeled as very early arrivers]; 2) whether they are usually *early* by *less* than 10 minutes [early arrivers]; 3) whether they are usually *late* by *less* than 10 minutes [late arrivers]; and 4) whether they are usually *late* for *more* than 10 minutes [very late arrivers].

In order to assess patient intent for future arrival, patients were given a hypothetical appointment time along with an expected arrival time (15 minutes before appointment time), and were asked to

select their intended arrival time for future appointments. Options included "before the arrival time", "at the arrival time", or "at the appointment time".

In addition, to estimate the patients' actual arrival delay or earliness, the arrival time at the front door of the clinic were recorded for all the arriving patients during the study period and compared against their scheduled appointment time. For instance, for an appointment time of 10:00 AM, if a patient arrives at 10:10 AM (resp. 9:50 am), the actual delay (resp. earliness) would be 10 minutes. In our statistical analysis, we let positive (resp. negative) numbers represent arrival delays (resp. earliness).

Qualitative Methodology

A qualitative assessment was performed to better understand the psychosocial and behavioral implications patients face on arriving to their appointment on time. Eight individuals participated in an unstructured interview designed to better understand the process patients must undertake in order to arrive to the clinic for their appointment. An unstructured interview often begins with a broad open-ended question with subsequent questions and prompts based on the participant's responses (Moyle, 2002). This methodology typically is used in conjunction with the collection of other sources of data (DiCicco-Bloom & Crabtree, 2006).

The unstructured interview process allowed for the interviewer to build rapport with the interviewees, allowing them to open-up and express themselves in their own way (Cohen & Crabtree, 2006). In addition, the use of unstructured interviews allowed the interviewer to focus on the participant and their responses, thus creating a more enriched discussion (Cohen & Crabtree, 2006). For this study, participants were asked to share the steps or processes they take to arrive at the Family Medicine Center Residency Clinic (FMC) for an appointment. The purpose of the interview was to capture in patient's own words their perceptions of arriving for appointments and help clinic providers and team members understand the barriers that patients might face.

The eight interview participants were selected through a volunteer sampling method. Participants were asked participate in a brief interview (approximately 10-20 minutes) with the medical director of the FMC in exchange for a small monetary gift card. Participant identities were kept confidential from team members beyond the interviewer. The unstructured interviews were recorded and transcribed for accuracy in analysis. Two team members not involved in the interviews documented summary themes and issues based on the recorded interview transcripts notes.

Statistical Analysis

To determine whether perception of past behavior patterns continue to pertain to actual and future arrival times, we calculate 95% confidence intervals (CIs) for arrival delay/earliness of patients within each category of past arrival behavior patterns. In addition, we used two-sample t-tests to compare the expected arrival time of patients in different categories, as well as, several two-sample z-tests to compare the proportion of patients in each category who intend to arrive more than 15 minutes before their appointment time early for future appointments.

In order to assess whether patients' definition of "appointment time" can predict to future arrival times, we use single-factor Analysis of Variance (ANOVA) with "appointment time" definition being the factor with four different categories [time to arrive at family medicine, check-in time, time to be

called in room, time to meet the doctor]. To validate the ANOVA analysis' results, we perform a two-sample t-test analysis to check if the arrival times are different for "appointment to check-in" versus "appointment to receive care" categories. All analysis was conducted using Data Analysis Ad-in in Excel 2016 and SPSS Statistics version 25 (IBM Corp). A *p value less than or equal to 0.05 was considered to be statistically significant.*

RESULTS

Quantitative findings

A total of 524 individuals out of 1050 patients (50%) responded to the paper-based survey. Of the 524 adult patients who responded to the survey, we excluded 103 (19.7%) participants due to the missing data on either of their historical behavior patterns, future intentions for arrival, or their definition of appointment time. We analyzed the data for the remaining 421 eligible survey participants.

The majority of the patients (n=214, 50.8%) perceive the appointment time as the moment they should enter the family medicine door as shown in Table 1. The earliest arrival belongs to the group of patients who believe appointment time is the time when they should see the doctor (n=64, 15.2%). This seems to be logically reasonable, as patients know that before they can visit the doctor there are certain procedures to go over and they all take time. Among the remaining patients, 102 (24.2%) perceive the appointment time as the check-in time and 41 (9.7%) as the time to be called in patient room. . With regard to perceptions about the definition of appointment times (Table 1), patients who perceive the appointment time as the time when they should see the doctor arrived on average of 15.7 minutes early, followed by those who perceive appointment time as the time to be called in the room (14.8 minutes early), the time to arrive at the clinic (14.3 minutes early) and the check-in time (11.0 minutes early), respectively. Table 1 provides a summary analysis of the data on the number of patients in each group and their actual delay/earliness (average and 95% CIs). In general, patients arrive on average 13.7 minutes before their scheduled appointment.

Based on the perceived historical arrival pattern, shown in Table 2, majority of patients classified themselves as "very early arrivers" (early by more than 10 minutes). The Confidence intervals values in Table 2 demonstrate that three groups of patients persist to behave the same way as they perceive their historical behavior patterns, while interestingly one group behaves completely different from the past arrival patterns. Patients who usually arrive early (very early and early arrivers groups) intend to arrive early by 19.1 and 6.1 minutes on average, respectively. Patients who are slightly late (late arrivers group) continue to arrive late by an average of 4.7 minutes. However, in contrast, patients who believe they have historically arrived significantly late (i.e., very late arrivers), actually arrived on average 28.3 minute early.

Table 2 suggests that the actual arrival time of patients can be significantly different depending on their perceived historical arrival behavior. In order to compare actual arrival time (delay/earliness) of patients with different perceived historical arrival behavior patterns, we perform multiple two sample t-tests shown in Table 3. This table provides p-values of the pairwise two sample t-tests for these comparisons, with the Rows and Columns corresponding to the perceived historical arrival pattern types. Each cell in the table verifies whether patients in the corresponding Row group actually arrived meaningfully earlier than the patients in the corresponding Column group. Table 3 reveals

Table 1. Understanding of "Appointment Time"

	Average Delay*	95% CI for delay	Count of patients
1: Time to arrive at clinic	-14.3	[-16.7, -12.0]	214
2: Check-in time	-11.0	[-14.0, -0.8]	102
3: Time to be called in room	-14.8	[-18.9, -10.8]	41
4: Time to meet the doctor	-15.7	[-20.3,-11.0]	64

Negative and positive numbers imply earliness and lateness, respectively.

Table 2. Perception of historical arrival behavior pattern

	Average Delay*	95% CI for delay	Count of patients
1: more than 10 minutes early [very early arrivers]	-19.1	[-21.1, -17.0]	245
2: less than 10 minutes early [early arrivers]	-6.1	[-8.2, -4.0]	154
3: less than 10 minutes late [late arrivers]	4.7	[-0.4, +9.8]	13
4: more than 10 minutes late [very late arrivers]	-28.3	[-39.0, -17.6]	9

* Negative and positive numbers imply earliness and lateness, respectively.

Table 3. Pairwise comparison of actual delay/earliness between patients with different perceived historical arrival behavior patterns

Two-sample t-tests		Perceived arrival time pattern			
Very early arrivers		Early arrivers	Late arrivers	Very late arrivers	
Perceived arrival time pattern	Very early arrivers	–	(-6.1 vs -19.1) p=0.000*	(4.7 vs -19.1) p=0.000*	(-28.3 vs. -19.1) p=0.927
	Early arrivers	(-19.1 vs -6.1) p=0.100	–	(4.7 vs -6.1) p=0.000*	(-28.3 vs -6.1) p=0.998
	Late arrivers	(-19.1 vs 4.7) p=0.100	(-6.1 vs 4.7) p=0.100	–	(-28.3 vs 4.7) p=0.100
	Very late arrivers	(-19.1 vs -28.3) p=0.073	(-6.1 vs -28.3) p=0.002*	(4.7 vs -28.3) p=0.000*	–

* significant at p<=0.05

that patients who perceive themselves as very late arrivers, arrive significantly earlier than those who perceive themselves as early arrivers and late arrivers.

Using a pairwise comparison, we assessed whether perceived past behavior pattern can explain the differences in future intentions, shown in Table 4. To perform this analysis, we first group patients in two categories of those who intend to arrive significantly early in future and those who do not. There was no significant difference between those who perceive themselves as very late arrivers and very early arrivers in terms of their arrival intention in future. However, both of these two groups have higher percentage of individuals who intend to come early in future (compared to those we perceive themselves as late or early arrivers).

A single-factor Analysis of Variance (ANOVA) found no meaningful relationship between patients' definition of "appointment time" and arrival patterns. On average, all patients arrive 10-15 minutes before their appointment time regardless of their differences in interpreting the "appointment time." Therefore, patients' understanding of appointment time does not serve as an explanatory factor for why they arrive late or early to their appointments.

Table 4. Pairwise comparison of patients with different perceived historical arrival pattern and future intended arrival

Two-sample Z-tests:		Perceived arrival time pattern			
Very early arrivers		Early arrivers	Late arrivers	Very late arrivers	
Perceived arrival time pattern	Very early arrivers	–	(0.74 vs. 0.58) p=0.000*	(0.74 vs. 0.38) p=0.002*	(0.74 vs 0.89) p=0.834
	Early arrivers	(0.58 vs 0.74) p=0.100	–	(0.58 vs 0.38) p=0.081	(0.58 vs 0.89) p=0.965
	Late arrivers	(0.38 vs 0.74) p=0.998	(0.38 vs 0.58) p=0.919	–	(0.38 vs 0.89) p=.0.991
	Very late arrivers	(0.89 vs 0.74) p=0.166	(0.89 vs 0.58) p=.035*	(0.89 vs 0.38) p=0.009*	–
Sample proportion of people who intend to arrive before the 15 min arrival time		0.74	0.58	0.38	0.89

* significant at p<-0.05

Qualitative findings

Seven of the eight patient interviews were transcribed and analyzed in order to identify themes using the patient's own words to better understand the barriers patients face on arriving to their appointment on time. Three primary themes emerge in the interviews related to the perception of arriving late to appointments at the FMC. Please see Table 5 for themes, subthemes and exemplar statements.

Motivated to be on time. Most participants expressed a great desire to arrive on time to their appointments. They described a recognition of the negative consequences of being late as patients (i.e., wasting others time) and as a consequence of clinic schedules running late (i.e., unhappy with long wait times at the clinic). Many believed, and stated, that they do not arrive late to appointments and take substantial measures to ensure that they are on time or early (i.e., telling rides that their appointment occurs at an earlier time than it is scheduled).

Transportation as a barrier. Overall transportation was described as a significant barrier for most participants. Those who did not own a car described the difficulty in arranging for transportation. Some, with cars, described the unreliability of their cars and fears that they might break down at the last minute. Many could describe no efficient strategy for getting to appointments and constructed elaborate, yet inefficient and often ineffective, plans to counter barriers of relying on uncertain and unreliable forms of transportation. This included arranging to ride with multiple friends and family members, building in redundancies to account for last minute changes in others' schedules and/or their undependability. Likewise, many described the difficulties that arose from trying to navigate the often unreliable public forms of transportation (i.e., buses, Medicaid Van). Some described concerns associated with transportation barriers such as safety concerns about riding with some people and waiting for public transportation. After reaching the FMC some described barriers associated with accessing the clinic due to parking distances and other obstructions to accessibility.

Table 5. Themes and Exemplar Statements

Theme	Subtheme	Exemplar statement
Motivated to be on time	Recognize need to be on time	"I was so mad on Friday. I said, I can't be missing my doctor's appointment." (S5)
	Unhappy waiting at clinic	"Well I like to be timely…I got here today at 8:10, my appointment was at 8:15 but I didn't get to see them until about 8:20, and then the doctor didn't show up until quarter till nine. That's a little aggravating to me." (S2)
Transportation Barriers	Difficult to arrange	"Well the first time I caught the bus, I caught the bus from home. I came downtown. I was trying to figure out what bus to catch to come over here. I sat downtown for four and a half hours, didn't know what to do, didn't know how to catch. I finally cried twice and told somebody to come get me… I missed my appointment. Cause then, I didn't know how to, they said they have the system where you can call transportation if you're on Hoosier Healthwise, and I still don't know how to do it, so I try to find out how that works, so they said you have to call a day ahead, I think, so I'm still trying to work that one out. When I finally, I asked, I don't know how many bus drivers how to get, I felt so, I was so upset that day. I cried. (S1)
	Concerns for own safety	"And the neighborhood isn't as good as it used to be. So it ain't like I can walk here. I'm gonna get mugged. That's just how it is. I'm gonna get mugged." (S3)
	Alternative plans are purposeful yet unclear, complex, and prone to failure	I usually plan about three people, three or four. Sometimes my son-in-law brings me, but his car has been down, I have to plan around him…[or] my daughter, when she off on Tuesday, I usually have to make my appointments on Tuesday, when she off, so she can bring me…[or] if it's in the morning, [my son] can bring me before he goes to work because he doesn't have to be at work until four…[or] my cousin then she got to come way from the north side to take me to a doctor's, because she's over there up north. (S7)
	Problematic accessibility to clinic	"It's so hard for me because I'm not fully handicapped- although somebody stole my sticker off my car someday… I have to park all the way over there, you know on the further side and walk, which, you know, is good exercise but not on a day like today." (S2)
	Unreliable transportation	"Sometimes my car breaks down. Sometimes I have to deal with that." (S1)
	Fear of losing access to care	"I usually make it [to the clinic], but you know I really don't like to miss because if you miss too many times they take you off the thing [schedule]. And that kind of scares me, I'm like oh my goodness." (S1)
Being late adds to patient anxiety	Lateness as antagonistic with perception of self	"I hate to be late anywhere. Drives me crazy. Some people will be late for their own funeral [but] it's not me…it makes me feel anxious." (S4)

Anxiety resulting from fear of being late. In addition to expressing a desire to be on time for appointments, some participants expressed fear and anxiety about the prospect of being late. This was expressed at two levels. At one level, they described that being one who is late is not consistent with their personal views of their own identity. Additionally, they expressed concern that if they are late they will lose access to the care provided by the FMC. This finding may help explain why patients who historically identify as arriving more than 10 minutes late are in fact arriving substantially early for clinic appointments.

DISCUSSION

In this study, patients arrived, on average, more 13 minutes early for their appointment, despite facing numerous barriers to care. While there is variation in what patients perceive an appointment time to mean, those differences are not related to statistically different arrival times. However, the patients' perceptions of their usual arrival pattern is associated with different actual arrival times at the clinic, with patients who perceive themselves as very (more than 10 minutes) arriving significantly earlier than those who perceive themselves as early or late (all other groups).

Through qualitative analysis, we identified that patients who face barriers to care are concerned about negative consequences to their healthcare visits, and subsequently express fear and anxiety when they arrive late. To avoid this, these patients make tremendous efforts to be on time. When patients are preparing for appointments, they describe efforts to create back-up plans upon back-up plans to avoid being late. This vulnerability and sense of threat creates powerful motivation for patients to protect themselves from further negative consequences. The concept of Fear Appeals and the Protection Motivation Theory (PMT) help us understand this threat appraisal and coping response by outlining a behavioral model by which to explain these statistically-significant findings.

The perceived threat of consequences following a late arrival to a medical appointment is assessed by the patient based upon on the premises of perceived vulnerability to the threat and perceived severity of the threat (Tannenbaum et al., 2015). Research by Tannenbaum et al. found multiple levels at which patients assess such threats associated with late medical appointment arrival. Several patients interviewed perceive themselves as being vulnerable to punctuality issues, as outlined by the many transportation barriers to care that they claim to face - including unreliability of vehicles, lack of vehicle ownership, un-dependability of friends/family members, lack of trust in public forms of transportation, concerns for safety, and concerns for parking/accessibility (Tannenbaum et al., 2015). The same patients expressed concern as to the potential severity and extent of these threats - including a fear of wasting others' time, a fear of stereotyping, decreased sense self-worth, and ultimately the possibility of losing access to care at the facility following an instance of late arrival (Tannenbaum et al., 2015).

The second component of the theory involves the patient assessing the potential of their reaction to this threat, based on their perceived self-efficacy and the efficacy of a response (Tannenbaum et al., 2015). Qualitative analysis demonstrated a commonality among patients in their creation of multiple backup plans and strategies to combat transportation barriers and mitigate the risk of unpunctuality. In addition, patients expressed their deep motivation to be punctual (even if significant measures need to be taken when overcoming transportation barriers to care), as well as describing late arrivals as being inconsistent with their personal views and overall self-identity (Tannenbaum et al., 2015).

According to PMT, following these assessments of the threat and coping response, the patient will ultimately develop behaviors -- which can either be adaptive or maladaptive (Norman, 2005). This study demonstrated that the patient subpopulation who perceived themselves as being very late in the past, actually arrived significantly earlier than all other groups studied. The seemingly over-corrective action taken by this particular patient subpopulation is an example of an adaptive behavior secondary to a perception of increased threat credibility combined with a lack of belief in an efficacious response strategy which has been overcome by an elevated self-efficacy. While it appears that specific individual response efficacy is diminished in this patient population (as evidenced by the need to create multiple plans involved in transportation efforts), this deficit is being overcome by persistence and an elevated sense of self-efficacy (as evidenced by patients' deep motivation to be punctual and belief that being late does not align with their personal identity). The conflict of patient tardiness with their personal identity aligns with the notion that meta-analytic review has found the concept of self-efficacy to be the factor most associated with protection motivation and the adaptive response (Milne et al., 2000).

Secondly, those who perceive themselves are being very late statistically intend to arrive more than 15 min before the appointment time. The findings of the study suggests a significant connection between patients' perceptions of historically arriving more than 10 minutes late to appointments and the intent to arrive more than 15 minutes prior to their future appointments. The Pairwise comparison of patients with different perceived historical arrival pattern and future intended arrival shows a high proportion (89%) of perceive very late arrivals intent to arrive more than 15 minutes prior to their future appointments (a statistically significant difference when compared to patients who perceive their past arrival pattern as arriving between 10 minutes early and 10 late). The positive association between the perception of being very late to appointments and the intent to arrive very early to future appointments suggests that negative perceptions or consequences of being late to clinic appointments drive patient desire to arrive at appointments early. This concept falls in line with PMT that the perception threat (fear, anxiety or negative consequences associated with missing appointments) and coping factors (ability or confidence to control behaviors and actions) drive individual behavior.[21] As discovered during the qualitative interviews, many patients reported awareness of the potential negative consequences of being late as patients (such as losing access to services at the clinic) and as a consequence of clinic schedules running late (thus waiting longer as a patient to be seen). As a result of the fear, several patients stated that they take substantial measures to prevent arriving late to appointments (such as arranging multiple rides, scheduling rides to arrive at clinic earlier than actual arrival time, arranging appointments to coincide when the individual is on the same side of town, etc.).

According to Norman et al. (2005) PMT involves an intent to engage in health protective behaviors (i.e., to be arrive on-time) and to avoid behaviors that compromise health (i.e., missing appointment) in response to a perceived threat. As described above, this outcome is fueled by two distinctive appraisal processes that result in either positive (on-time arrival) or negative (late) behavioral responses. The first of these processes is a consideration of the severity of the threat. It must be appraised at such a level to make salient that it indeed does pose a threat to the individuals' well-being. This seems to be the case as suggested by the interviews. Many described the fear that arises at the thought of being late, perhaps as a function of understanding the potentially negative consequences that may arise from arriving late for an appointment. Indeed, a primary theme of the qualitative analysis was the anxiety that patients describe from being late. Secondly, to engage in

adaptive health behaviors individuals must hold self-efficacious beliefs that they are capable of accomplishing the health protective behavior of arriving on-time to appointments. The interview data identified a rich network of barriers to arriving on time that arose from the lack of, or unpredictability of, transportation. Despite this most of the patients described confidence in arriving on-time to future appointments. This confidence was despite their great efforts arising from the need to construct intricate strategies for ensuring that they arrive on-time to appointments. Limitations of this study include limited existing research assessing patient appointment time punctuality. In addition, the use of a convenience sample and limited sample size for the qualitative research may result in an unrepresentative distribution of the FMC's patient population.

These findings shed light on just a few of the many moving parts involved in the relationship between patient behavior and clinic performance. This study demonstrates several key themes, in that most patients have a deep desire be punctual for their primary care visits, and a majority of them succeed at this - even if barriers to care often make it quite difficult to do so. The qualitative findings suggests that increased pressure to maintain punctuality, combined with barriers to care are associated with a substantial psychological and emotional burden placed on the shoulders of patients.

Furthermore, administrative policies and procedures, styles of management, and organizational culture have been shown to have very powerful effects upon physician well-being and burnout (Spickard et al., 2002). Organizational leadership should remain sensitive to this when instituting policy change that pertains to punctuality. As primary care clinics continue developing ways to combat clinic efficiency and performance issues, vigilance and empathy in regard to these aforementioned themes will help to protect both patients and providers alike. Future studies should include similar surveys and qualitative analyses directed toward providers to gain better appreciation for role-specific perspectives.

The findings of this study indicate that regardless of patients' interpretation of appointment time, they typically arrive 10-15 minutes before the appointment time. Combined with the qualitative results, this study suggests that most patients are motivated to be on time, in some cases seeing the idea of lateness as a contradiction of their own self-identity. Given our findings, future research is vital is better identifying how to better address organizational culture and structure within residency clinics that continue to contribute to the dysfunctional clinic flow and competing time demands of providers working with individuals with complex health needs.

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